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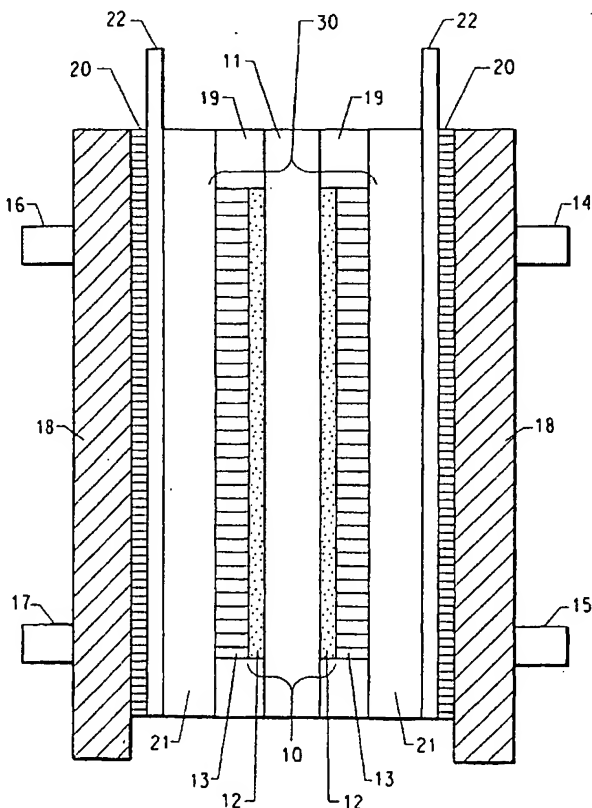
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(54) Title: SULFONIMIDE CONTAINING COMPOUNDS AND THEIR USE IN POLYMER ELECTROLYTE MEMBRANES FOR ELECTROCHEMICAL CELLS



(57) Abstract: A compound having the general structure (I), wherein  $A_{i1}?$  is a monovalent, divalent, or trivalent aromatic heterocyclic group comprising heterocyclic rings;  $R_{i1}?$ ,  $R_{i2}?$ , and  $R_{i3}?$  are divalent fluorinated groups;  $m$ ,  $n$ , and  $p$  are 0 to 3, with the proviso that  $m + n + p$  is equal to 1, 2, or 3 so that the carbon atoms of the heterocyclic rings are fully substituted by acidic fluorinated sulfonyl-containing groups;  $q$  is 0 or 1;  $Y_{i1}?$  is  $-OH$ ,  $-NH-SO_2\#191-R_{i4}?$  wherein  $R_{i4}?$  is a monovalent fluorinated group,  $-NH-$ ,  $-NH-SO_2\#191-R_{i5}?-SO_2\#191-NH-$ , or  $-NH-SO_2\#191-R_{i6}?-A_{i2}?-R_{i7}?-SO_2\#191-NH-$ , wherein  $A_{i2}?$  is a divalent heterocyclic group and  $R_{i5}?$ ,  $R_{i6}?$ , and  $R_{i7}?$  are divalent fluorinated groups; and  $Y_{i2}?$  and  $Y_{i3}?$  are  $-OH$  or  $-NH-SO_2\#191-R_{i4}?$ ; with the proviso that when  $m$  and  $n$  are each equal to 1,  $p$  is 0 to 1, and  $q$  is 0,  $Y_{i1}?$  is selected from the group consisting of  $-NH-$ ,  $-NH-SO_2\#191-R_{i5}?-SO_2\#191-NH-$ , and  $-NH-SO_2\#191-R_{i6}?-A_{i2}?-R_{i7}?-SO_2\#191-NH-$ . By compound is meant either a small molecule or a repeat unit of a polymer. The invention also provides a solid polymer electrolyte membrane, a membrane electrode assembly, a gas diffusion electrode, an electrocatalyst coating composition, and a fuel cell.



FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,  
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
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